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USDA ■ Forest Service

forest pest management methods application group

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NEWSLETTER

THE PLIGHT OF THE AERIAL PHOTOGRAPHER

The morning sky over Lake Champlain was bright blue and clear. With camera loaded and flight plan filed, pilot Bob Hedrix, and Dick Myhre, MAG scientific photographer, taxi for takeoff at Burlington International Airport. As they cross over Lake Champlain, headed toward the high peaks of the Adirondack Mountains, the first wisps of cumulus clouds begin to form. As they approach the first target site, the wisps become full blown clouds and they realize its going to be another one of those days. If they are really lucky, maybe they'll get that first block flown.

Such was the plight of MAG's aerial photo team this summer; first in coastal Alaska, then in the northeast. Day after day of heading to the airport, checking the weather, maybe taking a chance on flying, only to have to turn back with little or no progress made. The loss of a weather satellite over the eastern United States during the summer increased their frustration level by adding to the ambiguity of forecasts.

Alaska's two week mission expanded to four. A planned three week trip to photograph a variety of targets in New England, New York, and Wisconsin required seven and a half weeks.

Finally, one afternoon in early September came some good news; Queen Air N-128Z and crew were on their way home with all projects successfully completed. The bad news; when Dick Myhre walked through the front door of his home, the family dog, thinking he was a stranger, attacked him.

SECOND MULTISTATE GYPSY MOTH SURVEY COMPLETED

The MAG aerial photo team was not the only team delayed by excessively long periods of cloudy weather this year. In late June, NASA's ER-2 arrived at Wallops Island, Virginia, to begin the second multistate photo project to map gypsy moth defoliation. This year's mission was to include all of Delaware, Maryland, New Jersey, and Pennsylvania, the eastern panhandle of West Virginia, and northern Virginia. In addition, portions of northern Maine were photographed to map tree mortality by spruce budworm and portions of West Virginia's Monongahela National Forest to conduct a preliminary assessment of red spruce mortality. Once again, the film was processed by the Environmental Protection Agency's Environmental Photographic Interpretation Center near Warrenton, Virginia.



Annotating one of several miles of panoramic aerial film for the 1984 gypsy moth mission. Emmett Wilson of the Southern Region's Doraville Georgia FPM Field Office is locating photo frames while EPIC deputy director Frank Wolle looks on.

For awhile it was uncertain as to who would win, the weather or NASA's photo team. The contest was a close one with the photo team gaining the edge during the final days and obtaining about 75 percent of the planned coverage. The real disappointment was in being unable to get photo coverage of Delaware, the southern tip of New Jersey, and the eastern shore of Maryland. However, the photography that was obtained was of good quality.

This year's project received considerable publicity with an NBC TV spot that was shown in much of the target area and as far south as Knoxville, Tennessee. A Charleston, West Virginia, newspaper columnist,

Jamie Logue, poked some satirical humor at the team's efforts by describing the fictitious crash of a Forest Service U-2 in the eastern panhandle of West Virginia, followed by the capture of the pilot by gypsy moths protesting the survey.



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SPRUCE DIEBACK AND MORTALITY SURVEY

An extensive inventory, designed to estimate the severity of a dieback and mortality of red spruce and balsam fir, is underway. This condition, whose cause is presently unknown, is receiving a great deal of public attention. The survey is a cooperative effort by the Durham Forest Pest Management Field Office of the Northeastern Area, MAG, and several states. Areas included in the survey are the Green Mountains of Vermont, the White Mountains of New Hampshire, and the Adirondack Mountains and Tug Hill Plateau Regions of New York.

The inventory includes an aerial photo phase where a series of 8,000 acre sample blocks were photographed in each of the four survey areas. Vegetation in these blocks was classified according to the proportion of red spruce and balsam fir and degree of mortality. The second phase involved detailed counts of dead and dying trees on 2-1/2 acre sample plots. A sample of these plots are being ground cruised by field crews from the Durham Field Office and state forestry agencies in New Hampshire, New York, and Vermont.

Aerial photography is now complete and photo interpretation of the Adirondack Mountains is completed. Photo interpretation is being done by a team from the Nationwide Forestry Applications Program (NFAP) in Houston, Texas. NFAP director, Phil Weber, arranged for detailers from Forest Service Offices around the country to help with the photo interpretation. A second photo interpretation team was recently assembled in Durham, New Hampshire. Ground crews are presently working in the Adirondack Mountains and Vermont.

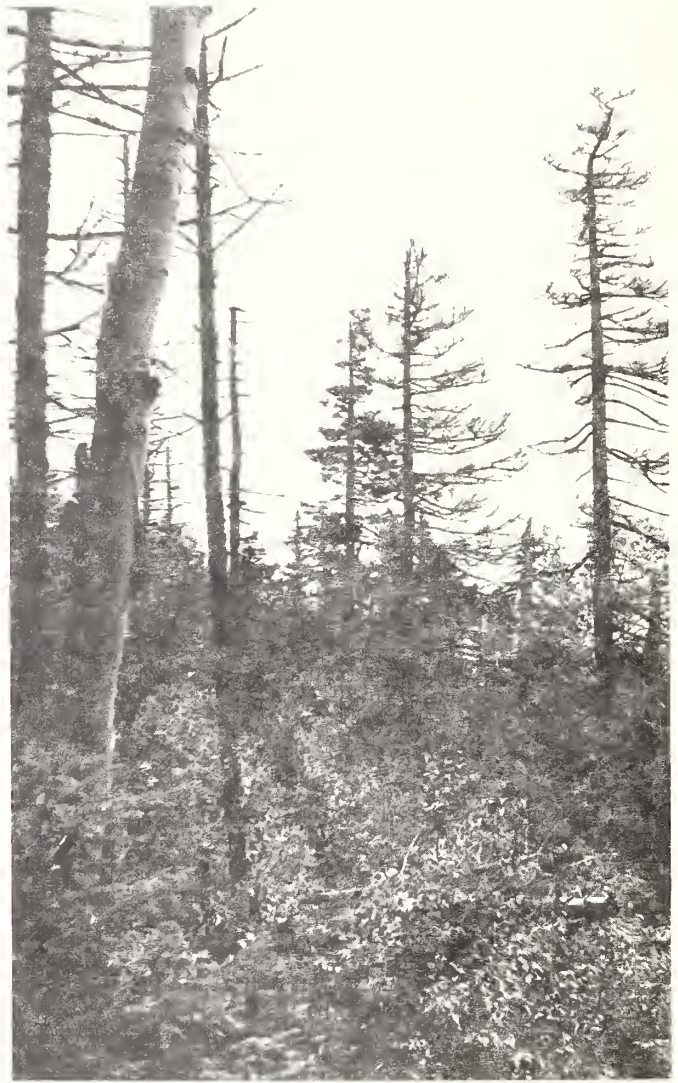
This project is providing an opportunity to evaluate the Bausch and Lomb Resource Measurement Systems (RMS), a computerized area digitizing measurement and storage system. Rex McHail, photogrammetrist with Bausch and Lomb in Rochester, New York, made the unit available to NFAP to test and demonstrate in association with this survey.

ECONOMIC ANALYSIS OF SILVICULTURAL TREATMENTS AND MOUNTAIN PINE BEETLE INFESTATION ON THE BLACK HILLS NATIONAL FOREST

Several studies have been conducted to determine the causes and assess the impact of mountain pine beetle epidemics in the Black Hills National Forest in South Dakota. Information regarding mountain pine beetle damage, diameter distribution, stand age, and stand density provide an excellent opportunity to examine the hypothesis that thinning reduces damage from MPB.

In this study, Joe Lewis and Tom Hofacker, both with the Washington Office FPM Staff; and Will Hoskins, of MAG; together with Dick Kessler, Timber Management, Black Hills National Forest; and Gene Lessard, Rocky Mountain Region FPM; are examining several harvest schedules which vary by thinning intensities. Mountain pine beetle outbreak probabilities and damages will be integrated with the RMYIELD tree growth and yield model to project harvest volumes for each harvest schedule.

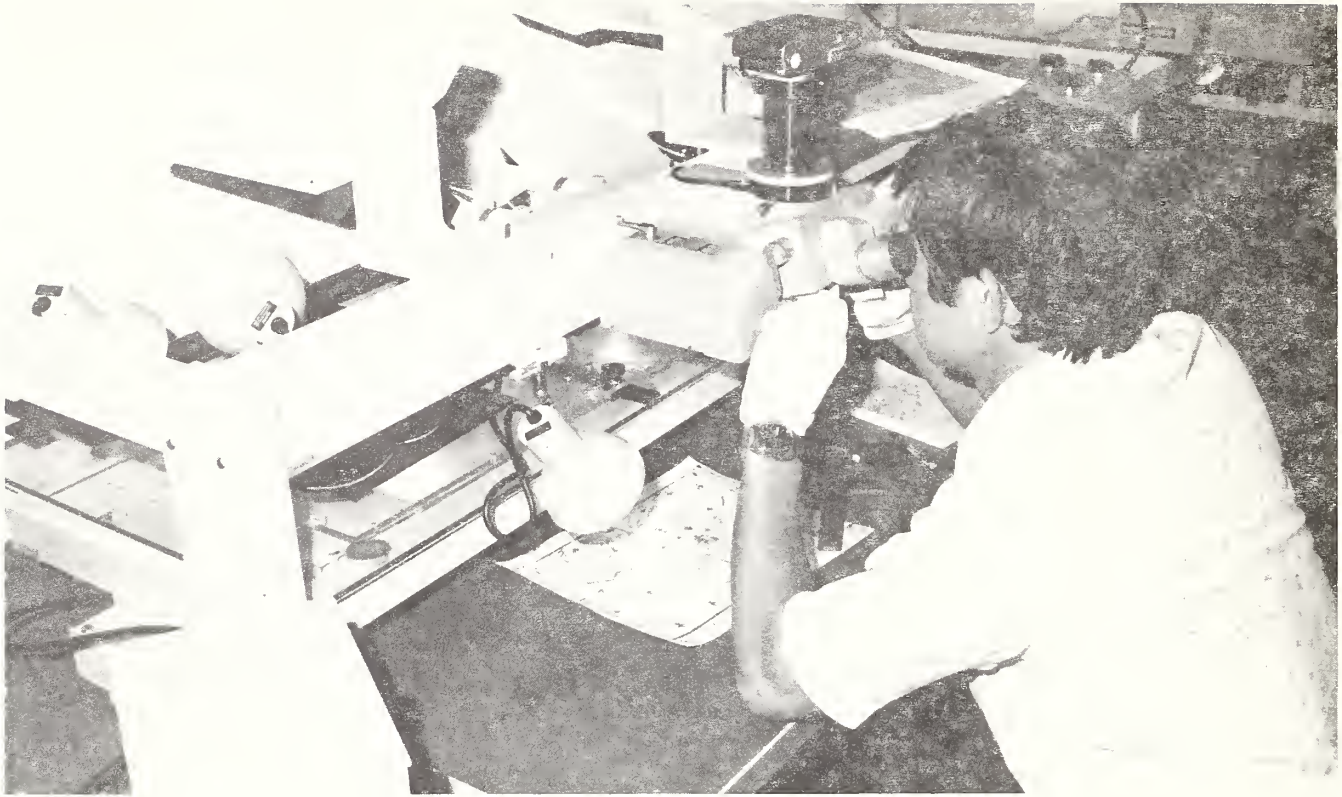
The objective of this analysis is to determine the most efficient thinning schedule in stands susceptible to mountain pine beetle on the Black Hills National Forest.



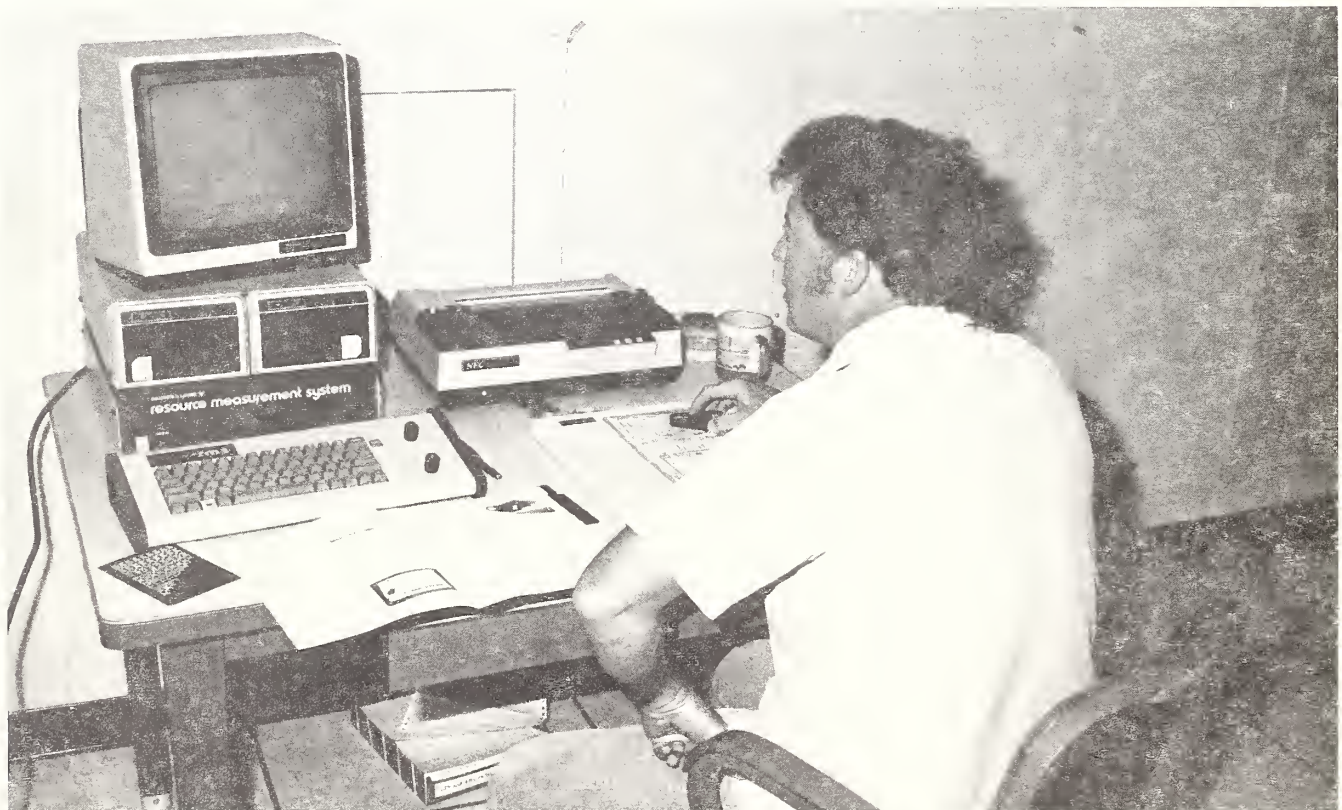
Spruce-fir forest near the summit of the Camels Hump in Vermont with trees in varying stages of decline and mortality.



Interpreting aerial photography of spruce decline at the Nationwide Forestry Application Program in Houston, Texas. Photo interpreters stratify vegetation/damage classes directly on the photos.



Paul Ishikawa transfers data from photos to maps using a zoom transfer scope.



Jerry Greer obtains area of the various vegetation/damage strata using the Bausch and Lomb Resource Measurement System.

NEZPERCE NATIONAL FOREST SELECTED FOR IPIAS DEMONSTRATION

The Red River Ranger District of the Nezperce National Forest in northern Idaho has been selected as the site for demonstrating operational activities relative to IPIAS. One of the first activities will be to digitize various data themes into the U.S. Fish and Wildlife's (WELUT) Geographic Information System (GIS), MOSS. Some of the major themes are cultural features; lakes, streams and rivers, public land survey, land line location, timber stands, capability areas, watersheds, soils, wildlife, habitat type, minerals, and location of mountain pine beetle infestations in lodgepole pine stands.

Once the GIS data themes are entered and hardware configurations are resolved, other IPIAS activities, pest/stand (Prognosis) linkages, data base management (S2K) access, contagion model testing, and socioeconomic linkages can be initiated. By late FY 85 a basic IPIAS structure should be in place on the Red River Ranger District.

The increased interest in IPIAS has led to an expansion of the steering committee beyond investigators and direct users of IPIAS related products. Ken Knauer, Assistant Director of Forest Pest Management, USDA Forest Service, Washington, DC; John Laut, Forest Pest Management, Colorado State Forest Service, Fort Collins, Colorado; Max Keetch, Computer Specialist, Area Planning and Development, Fort Collins, Colorado; Tom Kovalicky, Forest Supervisor, Nezperce National Forest, Grangeville, Idaho; and Dan Schroeder, Timber Management, Fort Collins, Colorado, will join the steering committee. Bill Ciesla, MAG Group Leader, will serve as chairperson.

The first meeting of the expanded group will take place on November 6 and 7, 1984, in Fort Collins.

IPIAS CONCEPT MOVES EAST

Bruce Morse and Herb Kulman, Department of Entomology, University of Minnesota, are well on their way toward applying the IPIAS concept in the northeast. Three pests, Saratoga spittlebug, spruce budworm, and white trunk rot of aspen (Phellinus tremulae) have been selected for integration into a fully operational geographic data base on the Nicolet National Forest in Wisconsin. This will permit acquisition of impact data on these pests using the IPIAS approach and full integration of insect and disease data into the Nicolet's forest plan.

COMPUTER GENERATED AERIAL SURVEY MAPS

The U.S. Fish and Wildlife Service's (WELUT) geographic information system, MOSS is being used to generate forest insect and disease aerial detection survey maps.

MOSS generated maps of the Nicolet National Forest in Wisconsin showing location of spruce-fir stands were used by Steve Munson of the Northeastern Area's FPM St. Paul Field Office to fly the forest for spruce budworm defoliation and tree mortality as well as other pest problems.

Data themes included on the maps were major lakes and rivers, cities and towns, road systems, and timber stands. The latter being differentiated into density/size class stands of white spruce and balsam fir.

Steve is preparing a short publication documenting this procedure.

WORKSHOP TO DEVELOP A MPB CONTAGION (RISK OR HAZARD RATING) MODEL

The Adaptive Environmental Assessment Group, U.S. Fish and Wildlife Service (WELUT) facilitated a workshop where procedures were outlined to be followed in developing a contagion (risk or hazard rating) model for mountain pine beetle in lodgepole pine forests for integration into IPIAS. Two major components: 1) a mountain pine beetle damage model; and 2) a contagion model, were developed.

In developing a mountain pine beetle damage model participants avoided the usual population dynamics approach. The advantages of not having an explicit representation of mountain pine beetle numbers is the avoidance of many nonquantified relationships that would otherwise be required. The primary calculations in the mountain pine beetle model include: 1) hazard indices based on stand characteristics; 2) trees killed; 3) an MPB brood production index; 4) the probability of an outbreak starting or growing; and 5) the new beetle index based on current year's brood production and dispersal.

The contagion model will then calculate how the beetles, and related tree mortality, will spread to surrounding stands. Several different approaches to representing this phenomenon were discussed. A modification of a dispersal matrix (grid cell) approach previously used to model dispersal of spruce budworm was proposed as a starting point.

The final report of this workshop will be presented to the IPIAS Steering Committee at the November 6-7 meeting. At that time the report will be available for general distribution.

WESTERN SPRUCE BUDWORM GROWTH IMPACT SURVEYS

Prolonged defoliation of Douglas-fir, grand fir, subalpine fir, and other host tree species, by the western spruce budworm effect tree growth. This past summer stands sampled in Region 4 as part of the Boise National Forest timber inventory were subject to more detailed data collection. From a sample of trees both host and non-host increment cores were taken at breast height. These cores were then sent to the Forestry Science Laboratory in Moscow, Idaho. The width of each growth ring was measured and stored as computer records. This growth history, of 60 or more years, can then be analyzed to detect periods of depressed growth. These periods can then be checked against the history of western spruce budworm defoliation for the area where the stand is located.

A similar set of data is being compiled in Region 1 for the Lolo National Forest. In this case the stands selected during the most recent forest inventory are being revisited to obtain the increment cores.

It is hoped that, through proper statistical analysis, stands can be classified as having or not having a growth (diameter) impact during outbreaks of WSBW. The probability of a growth impact will then be examined through logistic regression in an attempt to associate it with stand characteristics. This study was initiated by CANUSA-West and is now being continued by Michael Marsden (MAG), FPM in Regions 1 and 4, and Intermountain Forest and Range Experiment Station.

PECORA X

The 10th William T. Pecora Memorial Symposium will take place at Colorado State University in Fort Collins, August 20, 21 and 22, 1985. This symposium, named in honor of the former Assistant Secretary of Interior, addresses a specific application of remote sensing each year.

The theme of the 1985 symposium is Remote Sensing for Forest and Rangeland Resource Management. In addition to its regular sponsors, the US Geological Survey and NASA, this symposium will be jointly sponsored by the Society of American Foresters, the Society for Range Management, and the American Society of Photogrammetry.

Bill Ciesla, MAG Group Leader, and Dick Driscoll, former Director of the Resources Evaluation Techniques Project, Rocky Mountain Forest and Range Experiment Station, will serve as program chairpersons.

PRESENTATIONS

Bill Ciesla presented a paper on the use of panoramic aerial photography for mapping hardwood defoliation at the Fifteenth Congress of the International Society of Photogrammetry and Remote Sensing held in Rio de Janeiro, Brazil, June 17-29, 1984.

Bill White and cooperators Terry Daniel, University of Arizona, and Greg Buhyoff, Virginia Polytechnic Institute and State University, presented three papers at the International Spruce Budworms Research Symposium at Bangor, Maine. The papers were given as part of the "Population and Impact Assessment Workshop - Quantifying Impacts on Forest Growth and Yield".

ACTIVITIES

Clay Lyon, a student of geology at Colorado State University, joined the MAG staff as a seasonal employee. Clay had previously worked for MAG under the college work study program. He spent a large share of the summer working in Houston, Texas, as part of the photo interpretation team working on the spruce dieback and mortality survey.

Dona Davis left her position as clerk typist to take a job with the US Postal Service in Windsor, Colorado. We wish Donna the best of luck in her new position.

Sally Scrivner joined the MAG team as a part time clerk typist replacing Dona. Sally was formerly employed in a similar capacity to the Area Planning and Development Computer Systems Specialist in Fort Collins.

Bill Ciesla has been appointed secretary of the Society of American Foresters Working Group A2, Remote Sensing.

Bill Ciesla has been assigned to serve on a multiagency task force to design surveys to inventory effects of atmospheric deposition on terrestrial ecosystems.

Bill White served on an interdisciplinary team to develop a draft Interim Directive relative to the Forest Service's acquisition of a Geographic Information System. The team report and recommendations are currently under review by the Systems Management Review Team Monitoring Group, Dale Robertson, Chairman.

Will Hoskins, MAG's mathematical statistician, is headed for California. Will has accepted a job as a computer systems analyst with the Department of Justice, Immigration Service in Los Angeles.

PUBLICATIONS

Ciesla, W.M. 1984. Mission: track the gypsy from 65,000 feet. American Forests, July 1984.

Ciesla, W.M. 1984. Panoramic aerial photography for mapping hardwood defoliation by gypsy moth in the northeastern United States. International Archives of Photogrammetry and Remote Sensing 25:A7 Commission VII, 111-123.

Marsden, M.A., D.B. Twardus, and W.M. Ciesla. 1984. Efficacy of bacillus thuringiensis on western spruce budworm relative to deposit density and foliar development. USDA Forest Service, FPM/MAG, Fort Collins, CO. Rpt. No. 84-7.

Myhre, R.J. 1984. The forest pest management nationwide aerial photography program - first year accomplishments. USDA Forest Service, FPM/MAG, Fort Collins, CO. Rpt. No. 84-6.

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